REMARKS

By the present amendment and response, claims 18, 25, and 36 have been amended to overcome the Examiner's objections. Claims 18-47 are pending in the present application and claims 46 and 47 have been allowed. Reconsideration and allowance of outstanding claims 18-45 in view of the following remarks are requested.

A. Rejection of Claims 18-22, 24-40, and 42-45 under 35 USC §103(a)

The Examiner has rejected claims 18-22, 24-40, and 42-45 under 35 USC §103(a) as being unpatentable over alleged Applicant's "admitted prior art." For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by amended independent claims 18, 25, and 36, is allowable.

The present invention, as defined by amended independent claims 18, 25, and 36, includes, among other things, a base comprising kinetically controlled growth mode single crystal silicon-germanium, a base contact comprising mass controlled growth mode polycrystalline silicon-germanium, where the base contact and the base are characterized by a controlled deposition ratio, "wherein said controlled deposition ratio causes said base contact to have a reduced resistance." As disclosed in the present application, a single crystal silicon-germanium base is grown by an epitaxial process in a kinetically controlled growth mode, which is relatively insensitive to the pressure and precursor gas flow rate. As disclosed in the present application, a polycrystalline silicon-germanium base contact

is grown in a chemical vapor deposition (CVD) process, such as a reduced pressure CVD (RPCVD) process, in a mass controlled growth mode.

As disclosed in the present application, the present invention takes advantage of the fact that the polycrystalline growth can occur without causing substantial growth in the base at lower temperatures. Thus, as disclosed in the present application, at lower temperatures, such as at 650° C, the invention achieves growth of polycrystalline silicon-germanium in the base contact without causing a substantial growth in the single crystal silicon-germanium base. Also, as disclosed in the present application, for precursor gas flow rates in a range of, for example, between approximately 100.0 standard cubic centimeters (SCCM) and approximately 400.0 SCCM, the epitaxial growth rates for the single crystal silicon-germanium are not significantly affected, while the polycrystalline growth rates vary substantially linearly as a function of the precursor gas flow volume.

Thus, as disclosed in the present application, the present invention advantageously achieves control over the ratio of polycrystalline silicon-germanium base contact deposition rate to single crystal silicon-germanium base deposition rate. Consequently, the present invention achieves control over the thickness of the polycrystalline deposition and also the structure in terms of how much of the deposition is polycrystalline and how much is amorphous or unstructured deposition. Thus, by controlling the deposition ratio of the rate of polycrystalline silicon-germanium base contact deposition to the rate of single crystal silicon-germanium base deposition, the present invention advantageously achieves a base contact having increased thickness, which advantageously reduces base

contact resistance, as well as improved crystal structure. Furthermore, as disclosed in the present application, the present invention achieves control of the properties of the polycrystalline deposition for the polycrystalline base contact while maintaining the advantages of gain, speed, and frequency response of the silicon-germanium HBT.

The Examiner states that the present application, at pages 2-5, teaches a structure comprising a base comprising a single crystal silicon-germanium and a base contact comprising polysilicon. Page 2 of the Office Action dated September 28, 2004. However, Applicant respectfully submits that pages 2-5 of the present application fail to teach, disclose, or remotely suggest a base comprising kinetically controlled growth mode single crystal silicon-germanium, a base contact comprising mass controlled growth mode polycrystalline silicon-germanium, where the base contact and the base are characterized by a controlled deposition ratio, "wherein said controlled deposition ratio causes said base contact to have a reduced resistance."

As discussed above, by controlling the deposition ratio of the rate of polycrystalline silicon-germanium base contact deposition to the rate of single crystal silicon-germanium base deposition, the present invention advantageously achieves a base contact having reduced resistance.

For the foregoing reasons, Applicant respectfully submits that the present invention, as defined by amended independent claims 18, 25, and 36, is patentable. As such, claims 19-24 depending from amended independent claim 18, claims 26-35 depending from amended independent claim 25, and claims 37-45 depending from

amended independent claim 36 are, *a fortiori*, also patentable for at least the reasons presented above and also for additional limitations contained in each dependent claim.

B. Conclusion

Based on the foregoing reasons, the present invention, as defined by amended independent claims 18, 25, and 36, and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 18-45 are patentably distinguishable over the art cited by the Examiner. For all the foregoing reasons, an early allowance of outstanding claims 18-45 and an early Notice of Allowance for all claims 18-47 is respectfully requested.

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Respectfully Submitted,
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